February 26, 2021

County Executive Marc Elrich
Assistant Chief Administrative Officer Adriana Hochberg and Climate Change Coordinator
Executive Office Building
101 Monroe Street, 2nd Floor
Rockville, MD 20850

Dear Marc Elrich, Adriana Hochberg, and colleagues:

We are pleased to submit these comments on the draft CAP as members of the Sequestration and Adaptation Technical Working Group. Our comments are mainly related to the sequestration section, with additional comments on adaptation as they touch on overall land use, green infrastructure, and natural resource issues.

Thank you for convening the process to produce the CAP. We know it has been a monumental task and we appreciate the great job done by your staff. Addressing climate change is no small task, and we acknowledge the complexity of this undertaking.

Overall, the draft CAP is very impressive as a greenhouse gas mitigation plan, and the Adaptation section is well done with some caveats. However, the Sequestration section in particular, and some aspects of the Adaptation section, require our special attention because they are outside the scope of the consultant's expertise and modeling tools. The Sequestration section is not as detailed and robust as the other mitigation sections because CURB does not model nature-based solutions. Furthermore, we offer some recommendations on framing that tie together the multiple and compounding benefits of nature-based solutions.

Our comments are organized in three parts: first, some of the big picture aspects to include in the CAP for framing the issues; second, our priority recommendations, especially on what is missing; and third, our specific comments on the various actions in the CAP.

We are happy to answer any clarifying questions you may have. We anticipate that the comments and replies will be accessible to the public, and we will continue to monitor, support and engage in this process.

Again, thank you for all your work on preparing this document.

Sincerely,

Philip Bogdonoff, Montgomery County, MD Resident
Susan Eisendrath, Montgomery County, MD Resident
Ellen Gordon, Board Member, Sugarloaf Citizens' Association
Cynthia Mackie, Montgomery County, MD Resident
Karen Metchis, Montgomery County, MD Resident
Louise Mitchell, Baltimore City, MD Resident
Dorcas Robinson, Montgomery County, MD Resident
Betsy Taylor, formerly, Montgomery County, MD Resident
Caroline Taylor, Executive Director, Montgomery Countryside Alliance
Sylvia Tognetti, Montgomery County, MD Resident

PART I: FRAMING THE BIG PICTURE

The Executive Summary should explain *why* this is an emergency. A simple paragraph that outlines the costs of flood events, drought, poor air quality, and extreme heat to the residents, businesses, and the government in the County would remedy this. It should also acknowledge how challenging it will be to achieve what is in this plan and that we must be focused if we are to increase our capacities for adaptation and resilience.

Clearly prioritize actions based on urgency, importance, or critical path. This applies to the entire CAP. While there are several figures that provide a glimpse of this kind of analysis, there is no prioritized list of actions. In addition, priorities, sequencing, and pathways should be simply and clearly listed at the beginning of the document as a summary readily understandable by the general public who can not be expected to study this comprehensive document.

When prioritizing investments, consider the multi-faceted benefits offered by nature-based solutions (NBS), otherwise the CAP runs the risk of undervaluing them as individual actions and even causing unintended consequences of other more easily monetized solutions. NBS are relatively low cost compared to other strategies, while providing so many co-benefits essential for thriving communities. Furthermore, NBS and other adaptation recommendations offer immediate and tangible returns to the community. Realizing the outcomes of reducing GHGs will take many, many decades. Realizing the outcomes of NBS and adaptation will begin immediately and continue to grow year by year, engaging the public from urban gardens to student environmental projects.

Nature-based solutions, environmental stewardship, and biological sequestration – taken together – should be valued and advanced as the foundation for social well-being and ability to survive and thrive. The co-benefits of these approaches are critical to the resilience of communities because they support the ecological systems that we depend upon. Natural resources provide essential life services (e.g., healthy soils, clean air, clean water, pollinator habitats, etc.), act as a buffer to shocks and stresses (e.g., flood management, heat reduction, food and water security, etc.), sequester greenhouse gases, and increase the sense of well-being while increasing property values.

Integrate a broader understanding of resilience and sequestration. Taking a systems approach goes further than the concept of 'environmental stewardship'. It articulates the importance of land use in the carbon cycle. For example, regenerative agriculture is an illustration of this cycle: nutrient inputs become food (or other vegetation) that creates organic waste that, in turn, becomes nutrient inputs (minimizing the need to import fertilizers to the watershed); food and other waste can be composted to improve soils that then sequester carbon and infiltrate water to improve water quality, reduce flooding, replenish aquifers, and protect our water supply.

Elevate the weight of sequestration and adaptation into land-use and planning: The CAP only mentions the Thrive Montgomery 2050 general plan a handful of times, primarily to reference it, not to discuss the interdependencies and opportunities. It is important to acknowledge that there are gaps and challenges in getting to a landscape level or land-use framework approach. We believe the idea of whole system carbon management and planning could help move us in that direction, if the CAP was more focused on processes that analyze and assess ways to work within landscapes

Strengthen the Governance section by incorporating a systems approach. Consider hiring a systems analysis and practice consultant[1] to support planning and project development, and establish a position/office that sustains this practice in the County to support the planning and

[1] There are consultants who specialise in applying and building capacity for systems practice, focused on inclusive, multi-stakeholder processes to map out, analyze, identify leverage points for change etc in complex, interacting systems. In addition, think tanks and initiatives such as the multi-solving approach promoted by Climate Interactive, offer inspiring insights into the ways a systems approach can transform how government, businesses, and civic groups take climate action together.

climate teams. The County could also form a citizen advisory group on this approach to inform County efforts.

PART II: KEY RECOMMENDATIONS AND ADDITIONAL ACTIONS

Improve the Vulnerability Assessment. We find the vulnerability assessment in both the Appendix and CAP summary to be incomplete. While we recognize this requires a level of analysis that the contract (time frame, funding, contractor's skill, data, etc.) didn't allow, the CAP should articulate the intent and plan to pursue this in greater depth. Doing this will not only improve targeting of investment, it will help characterize the nature of the climate emergency to County residents.

Emphasize ongoing work that needs to be scaled or advanced. The County already has several operational programs that simply need additional investment or integration into a strategic focus, that then could help achieve 'triple wins' for reducing emissions, sequestering carbon, and building resilience (e.g., food reliance and access) in all aspects. For example:

- The Agricultural Reserve and other rural agricultural lands programs
- The Food Council recommendations and programs for increasing urban/suburban access to food and sustainable local production of food
- Tree Planting programs
- Rain Garden and Green Infrastructure initiatives and policies
- The *Strategic Plan to Advance Composting, Compost Use, and Food Scraps Diversion*
- The Land Link Montgomery program linking farmers with landowners

Count nature-based sequestration (i.e., biological sequestration) as part of the County's contribution to being climate positive and going beyond net zero. It should *not* be counted as an offset towards net zero emissions. The importance of nature-based solutions should not be reduced to sequestration alone, and should not be presented as an offset to emissions to meet the 100% goal (p. 139). The plan notes how much carbon sequestration our current forests, etc., achieve, but it does not include those numbers in its projections except to indicate that measures to address some of the anticipated 17% shortfall by 2035 will need to rely on nature-based sequestration. We feel this is counter to the intent of the Dec. 2017 Climate Emergency Resolution, which specifically set a goal of 100% reduction of emissions by 2035. Clearly, all forms of nature-based sequestration, both within the County's borders *as well as outside*, should be supported. However, commitment to the 100% emissions reduction goal should remain firm.

Commented [WD1]: I personally disagree with this. I think there might be broader support for including sequestration to meet our goals if we count "additional" sequestration beginning in FY22 or FY23 (as opposed to using existing sequestration which is just under 6% of our emissions).

Integrate actions for natural resource adaptation (as recommended by the Adaptation Technical Workgroup) intended to address the impacts of climate change. For example, the missing strategies aim to address invasive species, manage beneficial migration, and preserve diversity. While green infrastructure as a component of stormwater management is a strong part of the Adaptation section, protecting and managing impacts of climate change on our natural resources is almost nonexistent in the strategy. Changes in climate will exacerbate invasive

species, pests, and diseases; alter species composition (plant, animal, insect, and microbiome); and change the habitats those species rely on. The strategies necessary to promote natural resource adaptation are not identical to actions for sequestration, nor are they mutually exclusive, but taken together, they can be mutually reinforcing: the whole is greater than the sum of the parts.

Incentivize the transition of Agricultural Reserve farm land to regenerative agriculture. The County has the opportunity to help reduce atmospheric CO_2, take advantage of natural ecosystems services, enhance food security and address chronic illnesses that harm much of this country, but especially BIPOC, who are essentially victims of food apartheid, because of their inequitable access to fresh, unprocessed foods. Regenerative agriculture is a system of farming that not only produces high quality food, but also sequesters carbon, enhances the soil microbiome, increases water infiltration into the soil (and thereby increases resilience to both drought and heavy rainfall events), reduces the use of chemical inputs, often decreases the use of large farm vehicles (thereby helping lower farming's carbon footprint), and increases biodiversity. The list of co-benefits extends to fostering more humane animal husbandry, improved treatment of farmworkers,and an improved quality of life for the farm family.

Provide greater detail on increasing in-ground sequestration and soil health, including adding biochar and composting that are not mentioned at all. The section on waste management and whole carbon cycle management is undeveloped and rather vague. We think that the information the work group provided on soils and on composting should be highlighted and the explicit potential of biochar should be noted.

The plan should address the issue of local food self-reliance and equitable food access. As climate impacts worsen and affect global and national food production, and as the energy costs of food delivery from outside our region escalate – both of which will increase the cost of food – the role of the Agricultural Reserve and wider regional table crop production will come to the fore. The plan could be more explicit about protecting land currently and potentially suitable for crop production, especially in the Agricultural Reserve. It does mention education and helping farmers find local markets for their crops -- and the priority of those efforts could be boosted

Add a Sequestration Action: Implement the County's *Strategic Plan to Advance Composting, Compost Use, and Food Scraps Diversion*. That plan has specific recommendations for a diversified system for managing food scraps and food waste. All levels of composting, backyard, on-farm, on-site, and collection of food scraps for the government, commercial and residential sector need to be implemented. Compost use should be integrated into county programs and promoted to improve the health of our soils and to aid in carbon sequestration. This Plan should also be coordinated with the Food Security Plan which provides direction to divert food that can be consumed and used by food insecure residents.

Commented [WD2]: New action proposed

Regarding the section on Adaptation, we note that A1, A2, A4, A5, A6, A9, A10, A11, A12, A13, and A14 should be taken as a whole and tagged as high priority. These items need to be arranged and discussed in the context of how the county can cumulatively strengthen how to

address abatement of runoff and flooding in light of increasingly intense rainfall, impervious cover, and topography to address so-called 'nuisance' flooding as well as catastrophic flooding.

We note that you have included a recommendation to ban stormwater waivers per our workgroup's recommendation. We also would like to see inclusion of the Adaptation Workgroup's recommendation to adjust the county tree ordinance to ensure that the functions of the lost trees are replaced within the watershed, and that fees on developers removing trees be increased to pay for expanding the tree canopy and installing green infrastructure in the same watershed.

The draft CAP includes important actions related to heat- and weather-related human health and safety, but missed other risks such as the increase in insect-borne disease (e.g., mosquito and tick-borne diseases), and increased risk of harmful algal blooms in water bodies. Furthermore, regarding the health impacts of heat, the plan should expressly call out artificial turf as being counter to climate adaptation. Furthermore, it is essential for the County Health Department to address climate-related health risks.

Strengthen actions to engage BIPOC (communities of color), historically marginalized groups, and labor. We appreciate the strong emphasis on racial equity and social justice included in the analysis and intent of the CAP. We suggest investment in community-based organizations and residents to enable the county to better engage community members, and ensure their full participation in planning and implementation.

In the Governance section, add an action to use place-based approaches to collaboratively engage neighborhoods and communities and identify a list of shovel-ready projects that contribute to overall priorities that promote a systems approach to adaptation and sequestration.

What Can I Do? We are very surprised that this section does not include actions homeowners can take to increase sequestration and reduce waste by composting, installing rain gardens, plant gardens and trees, etc. It includes only one vague item on building resilience, vague compared to the level of detail on all the energy saving actions. This section could also add a component for how residents can help ensure systemic change in society.

The Plan should address the issue of climate migrants. As anticipated migrants enter the County, they will place pressure on the County's budget for implementing the many aspects of the CAP. However, they can also be an economic opportunity by adding a workforce to train and implement these actions. We suggest modeling demographic shifts in the future to evaluate the impact of population movement and growth due to climate change. Dramatically shifting population scenarios will impact the tax base, property values, demand for services, land, and resource use in the County. This further makes the case for taking a systems-based approach to scenario analysis and climate action.

The report can go further in highlighting where we might anticipate conflicts between actions or where there could be unintended consequences. Recommendations should be included for evidence based decision making, such as documenting the economic and social costs of options. We note that, overall, the report only touches on some of these potential areas of contention. A recent example is the discussion of Clean Energy concerning proposed expansion of solar energy in the Agricultural Reserve, as discussed on pages 89-90 of the CAP. Some conflicts arise from mixed jurisdictions such as State, federal and county governments inhibiting rational land use that favors reducing carbon emissions, such as road infrastructure proposals by the State for 495 and 270. While these evoke great emotions and opinions, with a strong dose of politics, it is important to highlight these sore spots requiring special efforts to address conflicting land use goals and solutions.

PART III: SPECIFIC COMMENTS ON CAP ACTIONS

A. Vulnerability Assessment and Climate Hazards (p. 33ff)

- We find the vulnerability assessment in both the Appendix and CAP summary to be incomplete. There is a thorough and excellent analysis for prioritizing the most socially vulnerable, but there is an unsatisfying analysis of risks in other areas. Specifically, there is no topographic overlay to understand risk to homes and businesses; there is no discussion of areas targeted for densification and undergoing significant change in impervious cover; and the analysis ignores areas with older housing stock (pre-1970's) that are typically owned by moderate income or older homeowners that are economically or epidemiologically at risk when impacts occur.

- In contrast to the thorough social vulnerability discussion, the section on Climate Hazards is unbalanced with regard to heat, precipitation and wind.

- *Heat:* The vulnerability analysis and subsequent discussion very briefly acknowledges a heat island effect, but it is not considered in determining the urgency or prioritization of cooling strategies to project human health county-wide or in socially vulnerable communities. Specifically, it is stated that the vulnerability assessment does not directly quantify the urban heat island effect "but it would likely increase." This is a huge blind spot. The urban heat island effect can increase effective air temperature some 15 degrees F. And green space substantially reduces effective air temperature - a benefit that can be quantified and valued. It is essential to evaluate not just the number of high heat days, but to overlay areas with high heat island effect county-wide for targeting cooling strategies. Including such an analysis would reveal the urgent priority for an aggressive campaign to expand tree canopy, green space, and strategies to cool the urban heat island.

- *Precipitation:* The discussion of precipitation is inadequate given the clear and widespread potential impacts, second only to extreme temperature. It relies on the existing outdated NOAA statistics as the baseline (Table 3, without attribution), and asserts moderate risk based on highly uncertain downscaling. It dispenses with a discussion of the observed and expected phenomenon that rain is falling in more intense, short duration events (due to limitations of the contractor's FLEx model). The discussion actually states that the 1-,5-,

and 10- year event will have little or no change! On what basis - on an admittedly limited FLEx model?

- By the way, the last paragraph on page 38 states that roadways are designed for 'current' precipitation conditions. This is inaccurate. In fact they are designed for *historical* precipitation conditions. These design statistics have not been updated by NOAA since 2000, and those were based on old data.

- The vulnerability analysis later does not discuss or compare the ability of our stormwater and drainage infrastructure to handle increasingly intense downpours. These parameters should be discussed and recommendations made for further analysis as a high priority.

- Furthermore, there needs to be more recognition that 'nuisance' flooding is misnamed in common parlance. While not catastrophic in the conventional sense, nuisance flooding is catastrophic to those affected economically. There are gradations of vulnerability.

- A note on the box on page 46, "Impacts of Urban Flooding on Climate Vulnerable Communities." The discussion may be accurate nationwide, but not necessarily in Montgomery County - and there is no analysis to explicate how this discussion manifests in our county.

- *Wind:* The Climate Hazards section also gives short shrift to a discussion of risks from hurricanes and high winds--because the contractor's FLEx tool doesn't have the data. In this case, there should be at least a literature search on the state of the science that leads us to expect more intense wind events in our area. During the Adaptation Workgroup's discussion, Earl Stoddard presented data showing that there have been an increasing number of high wind damage events in recent years.

B. Sequestration

Table 16: Estimations of Costs of Nature-based Solutions Needs Improvement
The summary Table 16 on p 139 lists County Actions associated with sequestration but does not clearly justify the cost estimations, particularly for S1, S2 and S3 listed as expensive. There are already significant County tree planting and maintenance programs and incentives in place such as Tree Montgomery, as well as nonprofits and businesses very engaged in regreening and biodiversity efforts. At the same time, many of these efforts save public funds, for example by reducing stormwater flooding response costs. We believe that what is needed is a review of where the log jams exist for accelerating tree planting and related regreening and soil conservation efforts. For example, DOT cannot tap the developer fees that fund Tree Montgomery, and has a serious backlog for replacing street trees This requires some tweaks to policies, rather than new full-blown programs.

S-1: retaining forests is not just about extreme precipitation...it is also heat. And why does it get three dollar signs to "retain" forests?

S-2 is a huge racial equity action, and does it really merit three dollar signs? isn't this offset by a fee developers pay for removing trees? isn't there a surplus?

S-3: three dollar signs?

S-4: high winds? three dollar signs?

S-1:

- Page 140: summary at top: Climate Risk Reduction here is not just about extreme precipitation. It is also about reducing the urban heat island effect that is given short shrift in this entire document. [It will educate the reader to note the role of plant transpiration in the local "small water cycle" - solar radiation powers transpiration of water via plants, water vapor carries heat to high altitudes where, when it condenses as rain, it sheds about half of the heat to space. So the "small water cycle" is Nature's air conditioning system. If solar radiation hits bare ground, asphalt, roof tops, etc., it heats those surfaces and the resulting sensible heat greatly warms the local environs.]

- Text box (Equity-Enhancing Measures)

    - First bullet in textbox: It is counter-intuitive to *prioritize retention of forests* where there is less 'access' to green space – this should be: "prioritize retention ***and expansion*** of forests…"
    - Fourth bullet: What does it mean to enhance the wood products industry? What does that mean? How does this increase opportunities to retain forests???

- It is worth mentioning very explicitly that the carbon value of mature trees in and outside forests cannot be easily replaced. In forests there are about 46-105 metric tons of above ground carbon per acre, depending on the age and composition of the trees. Planting saplings to replace mature trees cannot recover the lost carbon quickly; it takes 10-20 years. And improved utilization of salvaged woody debris is also an opportunity to reduce emissions from dead wood.

S-2:

- p. 141: last paragraph: add co-benefit for reducing the heat island effect.

- p. 142: S-2: text box: "Prioritize" - generically stating 'prioritize' doesn't convey an action or outcome. Please change this to "Prioritize the expansion of green corridors in more urban areas…"

- Increase Tree Canopy has very weak actions associated with it. There are land use codes for commercial development and residential areas as well as public lands which can have the existing guidance enhanced to (1) protect mature trees (their carbon value is very high) and (2) increase the canopy in urban and suburban areas. There is no mention of all the ongoing efforts by MoCo, despite details presented in our technical reports. In addition, this is the action that most engages the public and also serves as an educational effort. There are a myriad of movements across the country that reflects the enthusiasm for urban forestry, urban gardening, rewilding backyards, micro forests in suburban areas, and many others. This section needs to capture the great thirst within the County for collaborative, aggressive regreening campaigns that target under-represented communities and at-risk communities.

- Some attention should be paid to species selection for trees that reflects all the aspirations of nature-based solutions and addresses the specific needs of different communities. For example, native species of trees should be the overwhelming preference for much of the tree replacement and expansion efforts on public land. This is because the biodiversity and ecosystem stewardship impact of native trees is far superior to exotic species. There are times when food-producing trees that are not native, as well as food gardens are more appropriate to meet local food security needs. These decisions need to be informed by clear guidelines for species selection and maintenance with substantial input from communities and NGOs as well as the County experts.

S-3:

- p. 144: text box: same comment as above. Change "prioritize" to an action word.

- Restore Forests, Meadows and Wetlands. This is repetitive and could be combined with S-1.

S-4:

- Regenerative Agriculture needs greater attention in the CAP. It is at the nexus of:
  - addressing food security
  - growing healthier, more nutrient- dense food,
  - reducing how much GHG farming emits, and
  - increasing carbon sequestration in agriculture

- Overall we found this section weak and not reflecting the situation specific to Montgomery County.
  - Missing in the description are opportunities for biochar, hedgerow agroforestry, and permaculture options.
  - There is negative language about silvopasture without acknowledging that there are substantial horse farms where this approach is very beneficial to all. Remove the negative language (which is not needed and not difficult to address, and acknowledge that silvopasture is an important technique).
  - The State is rolling out substantial guidance for improved soil health on farms which might be touched on. Partnering with the Million Acre Challenge, for example, is one action the County could take.
  - It misses the Sequestration Workgroup's recommendation on urban/suburban farming, including opportunities for ethnic communities to establish small gardens and orchards to serve their cuisine needs, and the movement for revising HOA rules to allow residents to have native gardens, alternatives to grass lawns, etc. By educating and assisting suburban residents to move away from lawns (which provide no habitat, grow no food, and encourage polluting lawn equipment) would also help with carbon sequestration and access to fresh produce.
  - There are nascent farm carbon markets forming and the county could assist farms to participate.

- The CAP needs a better understanding of regenerative agriculture and how the Agricultural Reserve functions. One of the most important practices in regenerative agriculture is not even mentioned; managed rotational grazing of livestock that builds a permaculture system that improves soil and enhances carbon sequestration. The County will particularly need to incentivize the rebuilding of healthy soils in the Ag Reserve using

transferable development rights (TDRs). As that program is currently set up, it cannot be used to incentivize healthy soils. Furthermore, even if it was revised, it would only affect properties that have not yet sold their TDRs, which would miss a significant chunk of farmland in the Reserve.

- We recommend funding an additional position in the County's Office of Agriculture to take advantage of the new and enhanced funding opportunities, including those that will help redress racial inequities in agricultural assistance programs. In a county in which 60% of land being farmed has been leased to farmers, to truly effect large scale transition to regenerative agriculture, the County needs to help farmers and/or landowners to obtain grant funds, not just loans. Funding opportunities include:
  - The Biden Administration has been unequivocal in stating that agriculture will be a part of addressing climate change.
  - There are several carbon banks started by private companies and by philanthropic foundations to pay participating farmers to farm regeneratively
  - The State of Maryland has a 2 year-old Million Acre Challenge that provides technical assistance to farmers who want help transitioning to regenerative agriculture.
  - The Green Bank's mission is focused strictly on energy and needs to be revised to give regenerative agriculture sufficient weight to access this program.

- There is too much focus on silvopasture; it's important, but there's no reason to go into technical issues on silvopasture in an example that relates how it can be detrimental to farming, especially as there are solutions. Please use that space to provide more information on the co-benefits of regenerative agriculture, including ecosystem services like enhanced biodiversity and better runoff control.

S-5:

- Restore Soil - There is no mention of the potential for biochar even though it is rated as one of the highest carbon sequestration measures you can take for nature-based solutions. The County needs a detailed assessment, together with farmers, land developers and residents about incorporating biochar, woody debris, cover crops and replacement of lawns with alternative native vegetation that serves to improve soil sequestration, enhance biodiversity and local food production and reduce stormwater run-off. While this cannot be mandated easily, the County can provide incentives, pilot examples, and documentation of the economic and environmental benefits.

S-6:

- Whole Carbon System Tools. This section requires more framing and clarity. What the Working Group suggested was adding explicit considerations of both carbon emissions and ecosystem resilience to be incorporated into all decisions related to land use and development. In other words, documenting and giving greater weight to the impacts of a change in land use on:
  - The existing carbon stock in natural ecosystems and trees;
  - The impact on co-benefits such as biodiversity, clean air and water, stormwater flows, drought risk, food availability to at-risk communities and diminishing the impact of extreme heat events.

- The potential sequestration and co-benefits from interventions such as urban tree and meadow planting, community food gardens and improved management of all forms of organic waste including wood.

- In addition, the County may not need to develop a new tool. There are existing peer-tested tools such as the iTree suite of tools, agricultural soils interventions reflected in the USDA COMET Planner tool, and a variety of other tools and manuals to guide many aspects of urban and suburban tree planting and gardening: vibrant cities, urban forest management tool kit, and the American Forests tree equity score . The greater challenge is encouraging all stakeholders to adopt this way of perceiving nature-based solutions to climate change and using a common set of definitions, metrics and tools.

- We propose that a cross-cutting small team be established representing the County, business interests (like landscape design companies, farmers, NGOs involved now and schools) to agree on what to track and report as we move forward to understand the environmental, economic and health outcomes of interventions in the Sequestration and Adaptation realm. Metrics that we track consistently will influence policy over the long run. Using existing tools like iTree are highly preferable to reinventing the wheel.

- There is also a need to look at the entire lifecycle of all forms of leaf/wood waste as well as food waste within the County in order to identify opportunities for reducing emissions and pollution from materials that end up in landfills, at the same time improving soil health. This is also the potential for generating new jobs and reducing County expenses associated with landfills and garbage and leaf/wood waste collection. (Baltimore City is a great example of this.) The CAP recommendations by the Food Council on composting are endorsed here, with the added suggestion that the County assess opportunities for improving soil health by encouraging residents to retain more of their leaf litter and repurposing wood waste to be used for commercial products such as biochar, lumber and wood chips. Taking a systems approach to the analysis and utilizing guides such as a recent one on wood waste will improve the way the County addresses this issue.

C. Adaptation

- Overall, we like this section, with the caveat discussed above on the need to: improve the vulnerability assessment; address managing impacts of climate change on our natural resources; and take a whole system approach that elevates green nature based solutions in priority for both sequestration and adaptation.

- Infrastructure: We repeat this recommendation here due to its importance in the big picture: Actions A1, A2, A4, A5, A6, A9, A10, A11, A12, A13, A14: Taken as a whole, these items need to be arranged and discussed in the context of how the county can cumulatively strengthen how to address abatement of runoff and flooding in light of increasingly intense rainfall, impervious cover, and topography in order to address so-called ‘nuisance’ flooding as well as catastrophic flooding. There is no discussion of taking

a watershed-wide approach to managing flow. Furthermore, these actions collectively should be tagged as high priority.

- Upstream watershed management. The priority action areas highlighted on Page 43-44 for precipitation and the associated text should also acknowledge the importance of upstream watershed management coming into these urban communities as priorities for action. In particular, we examined many studies that highlighted the importance of improved vegetation planting along critical streams above urban areas as described on pp. 39 - 47, addressing Climate Vulnerability.

- In addition, actions for climate risk reduction from storm water needs to explicitly engage with WSSC, State authorities and other entities that influence the existing infrastructure and are not under county jurisdiction. p. 47-48

A-13:

- Stormwater waivers; tree replacement & related fees - we note that you have included a recommendation to ban stormwater waivers per our workgroup's recommendation. We would also like to see inclusion of the Adaptation Workgroup's recommendation to adjust the county tree ordinance to ensure that the function of the lost trees are replaced within the watershed, and that fees on developers removing trees be increased to pay for expanding the tree canopy and installing green infrastructure in the same watershed.

D. References

Please add this article to the references, as it is foundational to the concept of nature-based solutions, and was used in the poster session for the graphic titled "Climate Mitigation Potential in 2025." In addition, if this is mentioned elsewhere in the CAP please ensure accuracy of the link and citation.

J. E. Fargione, S. Bassett, T. Boucher, S. D. Bridgham, R. T. Conant, S. C. Cook-Patton, P. W. Ellis, A. Falcucci, J. W. Fourqurean, T. Gopalakrishna, H. Gu, B. Henderson, M. D. Hurteau, K. D. Kroeger, T. Kroeger, T. J. Lark, S. M. Leavitt, G. Lomax, R. I. McDonald, J. P. Megonigal, D. A. Miteva, C. J. Richardson, J. Sanderman, D. Shoch, S. A. Spawn, J. W. Veldman, C. A. Williams, P. B. Woodbury, C. Zganjar, M. Baranski, P. Elias, R. A. Houghton, E. Landis, E. McGlynn, W. H. Schlesinger, J. V. Siikamaki, A. E. Sutton-Grier, B. W. Griscom, **Natural climate solutions for the United States.** *Science Advances* 14 Nov 2018: Vol. 4, no. 11, eaat1869 **https://advances.sciencemag.org/content/4/11/eaat1869**

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